



Knowledge sharing practices and issues in policing contexts: a systematic review of the literature.

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Published version

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Knowledge Sharing Practices and Issues in Policing Contexts*

A Systematic Review of the Literature

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ABSTRACT

The effective sharing of knowledge both within and between police organizations is arguably becoming increasingly vital for success and has driven research in a disparate range of fields. This paper therefore presents the results of an integrative systematic literature review of research into knowledge sharing within and between police organizations across Europe. The 39 papers analysed were drawn from English-language studies published between 2000 and 2013, complemented by additional searches for non-English language papers in nine European countries. Analyses showed that past research has focused on intra-organizational knowledge sharing, with a particular spotlight on criminal intelligence and technology. Barriers / enablers of knowledge sharing were grouped into knowledge management strategy/legislation, technology, culture and loss of knowledge themes. Research recommendations include exploring the role of leadership and examination of police knowledge sharing across regional, institutional and international boundaries. Practical recommendations include having procedural clarity in systems, policies for sharing knowledge and developing the relevant knowledge, skills and motivation of police personnel through appropriate training.

Keywords: knowledge sharing, information, systematic literature review, police



EUROPEAN JOURNAL OF POLICING STUDIES, 3(3), 267-291
© 2016 MAKLU | ISSN 2034-760X | MARCH 2016

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1. Introduction

Policing is increasingly an information-rich practice where effective knowledge sharing within and between police organizations is arguably becoming essential for success (Dean, 1995; Kim, Matz, Gerber, Beto & Lambert, 2013; Puonti, 2004; Sanders & Henderson, 2013; Schneider & Hurst, 2008). Understanding the challenges and complexities of police knowledge sharing has consequently driven research within a variety of disciplinary fields but this has resulted in a fragmented literature. The aim of this paper is therefore to present the first systematic review of the topic that integrates the extant literature to highlight the different types of knowledge sharing and organizations studied, the major barriers and enablers that have been identified and summarise the concomitant practical and research recommendations. In the following sections, we will define policing and the police; discuss the importance of information and knowledge sharing; and describe the major debates and perspectives within which knowledge sharing has been included. We will round off with outlining the specific research questions that were addressed by this systematic literature review.

Policing can be defined as ‘those organized forms of order maintenance, peace-keeping, rule or law enforcement, crime investigation and prevention and other forms of investigation and associated information-brokering – which may involve a conscious exercise of coercive power – undertaken by individuals or organizations where such activities are viewed by them and/or others as a central or key defining part of their purpose’ (Jones and Newburn, 1998: 18-19). Mawby (2008) further outlines how the police are institutions that are responsible for the range of duties as above but can also address wider issues such as welfare and political functions. The police in practice show a great variation between countries and Mawby (2008) provides a useful perspective in terms of distinguishing agencies in terms of their legitimacy, structure and function. For example, he argues that police systems at the control-dominated end of the spectrum have maintaining order as their main function alongside some administrative tasks. These systems tend to be centralised nationally and militaristic, rarely providing public services that address community

needs; their legitimacy fails to be recognised by the general population. Examples are given here of Eastern European police forces. In contrast, at the other end of the spectrum are community-oriented police systems whose main function is to provide a service that addresses the wider needs of the community and, although maintaining order is important, crime is seen as symptomatic of wider social problems. Higher legitimacy is perceived by local communities and they are generally organised and managed locally. The UK policing model, with 43 regional forces in England and Wales, is provided as an example of this approach.

Despite the national variation in institutions, Manning (1992) states 'policing is a service occupation whose central 'input' and basis for action is information ... and the ways in which the police obtain, process, encode, decode and use information are critical to understanding their mandate and function' (p. 352). He further distinguishes how information is crucially used in terms of primary information (the 'raw data' about crimes initially encountered by police personnel), secondary information (primary information that has been processed within policing for crime solving or closing events) and tertiary information (managerial information that has been processed and moved up the organization). This perspective highlights a definitional issue encountered in the literature regarding the meaning of information and knowledge. Ericson and Haggerty (1997) consider no distinction is often made between information and knowledge, while Brodeur and Dupont (2006) state 'considered subjectively, knowledge is information that can be trusted' (p. 11). Conceptually, knowledge sharing is defined in this paper as the exchange between two or more parties of information believed to be potentially valuable (Davenport, 1997; Ipe, 2003) and involves both seeking and providing knowledge (Ingram, 2002; Wang & Noe, 2010). Typically, the popular view when discussing knowledge sharing in a police context is to consider handling of crime reporting or criminal intelligence, defined as information compiled, analysed, and/or disseminated in an effort to anticipate, prevent, or monitor criminal activity (International Association of Chiefs of Police (IACP) National Law Enforcement Policy Center, 2003). However, other potentially important types of information include aspects such as informing employees of new policies, procedures and strategies, changes in legislation, technology use, lessons learned, professional development, good practices and organizational performance (Abrahamson & Goodman-Delahunty, 2013). It should be acknowledged that the literature does not differentiate between the terms information and knowledge in a consistent manner but the latter construct is what is being used for the purposes of discussion in this paper.

The common argument for the link of exchange to organizational performance is that if knowledge is not shared appropriately then critical knowledge can be lost or detrimental effects incurred (Bontis, Crossan & Hulland, 2002; McDougall & Beattie, 1998). For example, in the UK, a failure to share information between regional police forces led to a previously-investigated individual being able to gain the position of school caretaker in Soham and subsequently murder two schoolgirls in 2002. The Richard enquiry into the case criticised poor practices of information distribution and directly led to the setting up of the Management of Police Information (MOPI) standards and the new Police National Database as more effective knowledge

sharing practices in the UK. More recently, Gillham, Edwards and Noakes (2013) showed how important rapid information integration and management was in the successful policing of protests in New York. Furthermore, through effective knowledge sharing, police departments can draw upon broad expertise, including the latest advancements in policing techniques and best practice. Knowledge sharing has been shown to be vital in minimising the repetition of errors and ensuring that inefficiencies are not perpetuated in different branches of an organization (e.g. McDermott & O'Dell, 2001). As a result, knowledge sharing appears to be crucial in supporting performance, innovation and positive change in response to the escalating demands of policing.

More critical debates are also apparent with the complexities regarding sharing of knowledge being a theme that has been involved in many of the police practice and research developments over the last few decades. First, studies of police organization structure have highlighted how fragmented, bureaucratic institutional forms can stifle the flow of information around police services and occupational culture research has suggested how sub-groups (e.g. frontline patrol officers) can be disinclined to share information with other sub-groups (e.g. detectives) (Bittner, 1970; Reiss, 1992; Van Maanen, 1975). Second, the introduction of new technologies over the years from two-way radio to computerised record systems, surveillance technologies and mobile computing solutions are continuing to transform policing. Although assumed to improve productivity and efficiency, there are indications that technologies can reduce officers' time spent on street-level activities due to the added requirements of completing and maintaining records (Chan, 2001; Koper, Lum & Willis, 2014). Related issues here include the tension between the desire to gather ever-increasing amounts of information and being faced with the massive task for sorting through and prioritising the collected data, therefore driving the development of new knowledge management systems (Gottschalk, 2010; Manning, 1992; Sheptycki, 2007).

Third, there are increasing knowledge linkages between police and non-police organizations when dealing with crime and security issues. Ericson and Haggerty (2000) make the argument for an expanding 'surveillant assemblage' where police organizations are now able to access records from insurance, educational, financial and telecommunications institutions and sometimes vice versa. Furthermore, global trends are showing a change in the governance of policing with non-police organizations increasingly taking over security roles (Marenin, 2005). The challenge here therefore becomes how and what information is co-ordinated between police and external security organizations. The need for better police collaboration with external agencies in the fields of probation, forensics, health and law has also been highlighted by recent research (e.g. Boyle, Snelling, White, Ariel & Ashelford, 2013; Kelty, Julian & Ross, 2013; Kim, Matz, Gerber, Beto & Lambert, 2013; Niemi, Sahramäki & Jukarainen, 2014). Fourth, a linked issue is the conception that we are moving towards a society where there is greater assessment and management of risk and hence where there is much greater collation and dissemination of data on individuals. Jones and Newburn (2013) describe this in the context of comparative

national policy changes regarding sharing information on location of sex offenders with local communities.

Fifth, there is an increasing movement towards transnational policing where international bodies (e.g. Interpol, Europol) co-ordinate operations across sovereign borders or where police organizations in different countries directly work with each other to build an integrated understanding of security issues such as human trafficking (Haberfeld, McDonald & Hassell, 2008; Reid, 2013). The Schengen Convention of 1990 and the 1991 Maastricht Treaty are examples of agreements which formally introduced the principles of greater co-operation between police forces. However, Sheptycki (2007) critically discusses how expanding international policing networks face problems of information silos within organizations while also pointing out the downside of the threats to civil liberties resulting from cross-border knowledge sharing of data on individual citizens. Sixth, at a higher level, Dolowitz and Marsh (2000) consider how lack of knowledge regarding policy content and the economic, political and ideological contexts in which they originate can influence the success of policy transfer from one domain to another. For example, Jones and Newburn (2013) discuss how lack of contextual knowledge affected the transfer of sex offender registration policies between the US and the UK. These types of themes therefore highlight how knowledge sharing in the future is only going to increase in scale (e.g. due to the growing impetus to collect more information as part of an enhanced risk management environment and greater citizen mobility) and to do so in increasingly complex inter-organisational and international contexts.

Despite the widespread interest in knowledge sharing by police organizations, it is also apparent that the literature on the topic is fragmented by both theme and disciplines as varied as criminology, sociology, technology, policy studies and management. Consequently, there is a lack of a cohesive overview on the major issues that have emerged on the topic (Manning, 2000) and also a lack of consistent practical guidance for policing leaders on how to improve knowledge sharing by their organizations. The aim of this paper is therefore to provide an integrated audit of the contemporary knowledge sharing literature which focuses on police organizations and provides some substantive research insight. For the first time with regards to the topic, this will be done by conducting a systematic literature review, defined as a *'review of the evidence on a clearly formulated question that uses systematic and explicit methods to identify, select and critically appraise relevant primary research'* (NHS Centre for Reviews and Dissemination, 2008). Thus, a systematic review is the ideal tool to draw a portrait of the current status of an area, with a view to informing practitioners and policy makers and identifying critical directions for future research. The advantages of this approach are that by clearly stating its research questions around a specific topic and transparently outlining the literature search criteria, it guarantees rigour, relevance, and replicability (Dowden, Bennell & Bloomfield, 2007). The paper further addresses a critique of the literature being dominated by Anglo-American, English-language papers (Manning, 2005; Marenin, 2005) by seeking to include additional relevant European-language papers using an international consortium of researchers as described below. This would help ensure

a wider range of national variations in policing are included in the knowledge-sharing discourse (Mawby, 2008).

Aims of the literature review

The current review was conducted as part of the European Union-funded COMPOSITE (Comparative Police Studies In The EU) research programme. The role of COMPOSITE was to investigate performance-related capabilities and large-scale change processes in police forces all over Europe with the aim of identifying the major factors that contribute to their success or failure. A distinct strength of the project was the ability to draw on research teams from a diverse range of countries that made up the COMPOSITE Consortium: Belgium, Czech Republic, France, Germany, Italy, Macedonia, The Netherlands, Romania, Spain and The UK. COMPOSITE Work Package 3 was tasked with developing an understanding of what makes for good police knowledge sharing capabilities. Given the previous discussion, it was decided to review the extant literature on the topic with the aim of clarifying the following six areas of interest:

1. What types of knowledge have been investigated most frequently in past research?
2. Which types of organizations have been most frequently investigated in past research?
3. What types of knowledge sharing activities, practices or processes have been examined most frequently and what are their benefits and drawbacks?
4. What have been identified as the main barriers and facilitators of knowledge sharing?
5. What are the key practical recommendations to promote knowledge sharing in policing contexts?
6. What are the major research recommendations suggested by studies in the area?

The methodology will be briefly described in the next section, followed by the findings and implications of the review.

2. Methodology

The systematic process that we used in order to conduct this literature review consisted of the following phases:

2.1. Searching

A number of keywords relating to the research topic were chosen, words which captured essential concepts to conduct the review and addressed the review aims. Keyword combinations were used to identify papers providing empirical evidence regarding the sharing of knowledge in policing contexts. The keywords used were:

'knowledge' (with alternative words to capture this concept being 'information' and 'intelligence' since it became apparent from initial investigation of the literature that these terms were used interchangeably with knowledge in many studies (Ericson & Heggarty, 1997)); 'sharing' (alternative words used were 'behaviour', 'management', 'seeking', 'transfer' and 'exchange') and 'police' (with the alternative words 'policing' and 'law enforcement'). 'Barriers' (alternative words were 'blockages' and 'inhibitors'); and 'enablers' (alternative words being 'facilitators', 'motivators' and 'capabilities') were also added.

All possible combinations of these keywords were used in searching for papers in order to meet the review aims. Three databases were used for searching for combinations of the keywords in English-language journals: Web of Science, Science Direct and EBSCO. Also, a number of journals were identified by the project team as potential sources of papers and these were hand searched using combinations of the keywords. The research team in each country identified appropriate electronic databases and journals to use for their search of non-English language papers. Three types of documents were considered: published journal papers, official policing papers, and conference papers.

It is important to note some of the issues that we faced when conducting this literature review, in particular pertaining to the translation of the research protocol into different languages. Several of the country research teams reported difficulties in translating the keyword search terms into their own language, and found that slightly different search terms proved more successful. For example, 'police work' rather than 'policing' was more easily translated into Dutch for the Netherlands search, and 'intelligence' for some countries was a more widely used term in the context of policing than 'information' or 'knowledge'. Despite this, the country teams still had difficulties in finding papers that met the search terms, with Czech Republic, Macedonia and Romania finding no relevant papers to be included in the review. A clear lack of published material uncovered in searches by country teams demonstrates a gap in the literature on this topic.

2.2. Manual Assessment

From those papers uncovered in the initial search, papers were subjected to a manual assessment by the research team and were excluded if they did not meet the following criteria: papers that had been peer reviewed, papers reporting original research findings or significant police-relevant reviews and papers published from the year 2000 onwards (up to and including December 2013). The year 2000 was chosen as a baseline due to time constraints for the COMPOSITE consortium research teams and the desire to provide a more comprehensive review of the 21st Century literature on the topic.

2.3. Data Extraction

The abstracts of all remaining papers were then assessed by the research team in terms of the keywords and relevance to the review aims. Papers that could be

categorised as ‘Police related paper, based on good empirical research (e.g. large sample size, recognised methods of research such as surveys, interviews, document analysis)’ or ‘Police related paper, content is theoretical / a review / synthesis of research, or based on weak / unclear empirical research’ were included in our study, i.e. those papers which related specifically to a policing context. This resulted in a final total of 39 papers for in-depth analysis representing the following countries: Australia (2 papers); Belgium (5); Canada (3); Germany (3); Italy (2); Netherlands (6); New Zealand (1); Norway (8); Singapore (1); UK (4); and USA (4).

3. Findings

Data was collated from each of the 39 chosen papers by researchers completing a structured template summarising key information contained in the article. The templates were then analysed for common themes, which are outlined below in relation to the aforementioned six areas of interest.

1. What types of knowledge are investigated most frequently in past research?

The first area of interest for our analysis related to what types of knowledge tended to be researched most frequently in previous studies. Overwhelmingly the papers found in this literature review are focused upon the sharing of police intelligence, with 29 out of 39 papers addressing it. The definition of ‘intelligence’ used by Gottschalk (2006b) describes information used for police investigations, including the gathering of evidence leading to the arrest of criminals, and the collection and presentation of evidence and testimony for the purpose of obtaining convictions. Other types of knowledge that were mentioned in papers, but with less frequency, included, organizational and administrative information (6), best practice (5 papers), informal knowledge and experiences (4), legal and judiciary information (2), technological knowledge (1) and employee information such as job role, duties and performance (1).

2. Which types of organizations are most frequently investigated in past research?

The second area of interest for analysis was on the types of organizations that are more frequently examined in past research. It should be noted that the literature was dominated by questionnaire, interview and case studies. Most commonly, papers referred to instances where knowledge sharing is ‘intra-organizational’, with 27 out of the 39 papers referring to this. By ‘intra-organizational’, we refer to examples where knowledge is shared internally in police organizations, either within or across police departments and hierarchies. A smaller number of 18 papers referred to where knowledge sharing is ‘inter-organizational’, by which we refer to knowledge being shared between different police forces, regionally, nationally or internationally. Finally, 10 papers referred to where knowledge is shared with other law enforcement agencies or partner agencies with which the police liaise,

for example, the health service, fire and rescue services, social services, probation and the courts. Some papers described more than one recipient of knowledge, for example, Keltly, Julian & Ross (2013) examined the interchange of information between police, forensic science, medicine and law institutions, highlighting the varying degrees of formality in the relationships.

Two papers discussed knowledge sharing across countries. Adang (2009) describes the international assessment teams, set up by the Working Group of the Police Co-operation of the European Union, to run evaluations of the management of public order across international football games. The study describes how the group enables police teams from different countries to share experiences and best practice, although there are also barriers being faced due to communication problems between different police organizations across countries. Stenzel's (2010) paper offers an examination of issues around the sharing of counter-terrorism information between German and US police authorities, describing problems which arise due to the different legislations and policies around data protection in the two countries.

3. What types of knowledge sharing activities, practices or processes have been examined most frequently and what are their benefits and drawbacks?

Overwhelmingly the literature uncovered in this search focused on the use of technology as a means by which knowledge is shared within policing contexts, with 30 out of the 39 papers mentioning it. For this section, therefore, the methods by which knowledge is shared are grouped into two sections: technology and other methods.

Technology

Eight of the 39 papers that were found in the literature search were published in Norway by Petter Gottschalk and colleagues, focusing on knowledge management systems within law enforcement. Gottschalk (in 2006a; 2006b; 2008; Gottschalk & Holgersson, 2006, Gottschalk & Dean, 2010) argues that, given the volume of information that police forces must possess, the use of large-scale information technology systems is essential. He proposes a model that conceptualises on a continuum the four stages involved in knowledge management within police investigations, and the level of IT support required at each stage, giving examples of types of applications from police investigations. The focus is on information which is captured, used and shared internally within police forces (intra-organizational). The four stages are: 1.) *Officer to technology* (general IT support for knowledge workers e.g. word processing software, legal databases; 2.) *Officer to officer* (use of IT to find and work with other knowledge workers, e.g. intranets, emails, staff profiles); 3.) *Officer to information* (use of IT to provide access to stored documents, via electronic depositories, e.g. databases, contracts, articles, reports); and 4.) *Officer to application* (use of a specific IT system designed to solve a knowledge problem, e.g. statistically orientated tools that classify cases into categories).

Online methods of knowledge sharing were discussed by 23 papers in total, and these methods included the use of online databases, mobile data terminals, intranet systems, internet and email. Wilz and Reichertz (2008) explored the use of email within the German police context, highlighting the ways in which the growth of the internet, the use of email, personal computers and mobile telephones, are part of a 'digital revolution', which has changed the ways in which information is shared, with more and more information being shared by police officers using these types of technology as opposed to via face-to-face meetings. Similarly, an Australian theoretical paper by Hughes and Love (2004) proposes a framework for a move towards 'virtual policing' or 'cybercentrism', a type of management orientation which involves a high emphasis upon interactive digital and virtual practices. Hughes and Love (2004) describe IT as a critical success factor in policing and a move towards internet-based communication as making it possible for many policing functions to be performed without requiring direct physical presence. Following this, Sanders and Henderson (2013) empirically investigate the challenges of using police computer-aided dispatch systems, record management systems and mobile data terminals in two Canadian forces. The study highlights the material, technological and organizational challenges of sharing information using these methods. Boyle, Snelling, White, Ariel and Ashelford (2013) provide an interesting recent account of setting up an information sharing system between Hospital Emergency Departments and local police forces as a way of beginning to build up a profile of assault patterns in a UK region. Three papers (Chen et al., 2002; Plecas et al., 2011; Redmond & Baveja, 2002) analysed the use of specific computer software systems designed to integrate intelligence databases across systems and users. Although there were benefits for officers in improving access to information, issues arose around the need for appropriate training, the financial cost of the software and its suitability for non-police agencies.

Other Methods

Other methods of knowledge sharing mentioned in the literature included both verbal and written briefings, meetings and face-to-face informal meetings and communication. Aden (2003) in Germany, describes police journals and journals associated with policing, as being used to share knowledge on policy, training, best practice, and processes. The author finds that police journals tend to focus on sharing the more positive aspects of policing and avoid the publication and sharing of taboo subjects such as police corruption and crimes committed by police officers. Kim, Matz, Gerber, Beto and Lambert (2013) focus on the role of police-probation/parole partnerships in the US and indicate how most partnerships were based on individual relationships and mainly informal in nature; this did lead to a common problem of relationships breaking down when certain individuals left their organizations.

Adang (2009) writes about the Working Group of Police Co-operation of the European Union which runs evaluations of the management of public order in international football games. International events such as this require cross-country

organization and communication and in this example face-to-face meetings between senior public order officers involve the sharing of intelligence, best practice, and the exchange of experiences.

4. What have been identified as the main barriers and facilitators of knowledge sharing?

The review of literature highlighted a number of barriers and facilitators which impact upon knowledge sharing and which we have grouped into four themes; knowledge management strategy and legislation; technology; culture; and loss of knowledge.

Knowledge Management Strategy / Legislation

The literature highlighted that inconsistent force strategies around knowledge management impact upon knowledge sharing. Seba and Rowley (2010) conducted semi structured interviews with head police officers across three UK forces and including the then-National Police Improvement Agency (NPIA). The findings showed that none of the organizations had an overarching knowledge management strategy or policy although there was widespread recognition of the importance of intelligence and knowledge sharing for successful policing. The current picture therefore was argued to be one of a diverse collection of initiatives, some at national level and some at individual force level. Similarly, research with Dutch forces has shown that each force develops their own instruments for sharing intelligence and this depends on the expertise and commitment of individual officers (Inspectie Openbare Orde en Veiligheid, 2008). Research conducted by Laere (1998; 2008) has shown that the regional organization of the Dutch police has some negative effects on knowledge sharing, for knowledge is unsystematically spread over the whole organization. Stentzel (2010) in a study of the communication between German and US police authorities, found that different legislation and strategies across the two countries made information sharing problematic. However, a survey study of three Canadian police forces (Abrahamson & Goodman-Delahunty, 2013) showed that the use of information management strategies by the organization was significantly related to positive information use outcomes (e.g. more effective problem solving).

Technology

As argued by Luen and Al-Hawamdeh (2001), in their research with the Singapore Police Force, with the increased adoption of information technology and the increasing overall quality and IT competence of police officers, the police organization is well positioned to share information effectively, and to better equip officers with the necessary means to discharge their knowledge sharing duties. As described earlier, 30 out of the 39 papers describe technology as enabling knowledge sharing to take place within policing. This does not mean, however, that technology does not

raise problems for knowledge sharing and several papers describe issues around technology as creating some barriers for the sharing of knowledge.

Lindsay et al. (2009) in their research on the impacts of mobile technology within Leicestershire Police in the UK, describe mobile technology as improving many aspects of policing, including: improving the availability of information for decision making purposes; speeding up business processes and improving the timeliness and accuracy of data; and giving officers greater confidence in making arrests and dealing with incidents due to having knowledge at their fingertips. Their paper suggests, however, that mobile technology presents a risk to interpersonal contact, via a reduction in the need for face-to-face meetings and briefings, meaning that there may be a reduction in the sharing of tacit knowledge and a risk of officers becoming isolated as they spend less time in the station. Likewise research in Germany (Wilz & Reichertz, 2008) suggests that the increased use of email has replaced personal face to face contact, and personal meetings now only occur for the 'fine tuning' of agreements that have already been made by email.

Other issues raised in the literature around the barriers caused by technology include variance in the technical proficiency of staff (Plecas et al., 2011), technology being expensive to update and maintain (Plecas et al., 2011), the tensions between private sector IT developers and policing needs (Sanders & Henderson, 2013) and disparate communication and computer systems existing between both different police forces and different agencies (Uthmani et al., 2010)

Culture

Another theme emerging from the literature was that around cultural issues which impact upon the sharing of knowledge, particularly aspects of the occupational culture within the police force. Participants in Sanders and Henderson's (2013) study discuss how departmental / agency 'empires' and 'silos' inhibit effective knowledge sharing. Berg et al. (2008) argue that leadership by police managers is needed to stimulate and encourage knowledge sharing in police investigations. Their survey conducted in Norway with senior investigation officers looked at management roles and how they affect knowledge sharing, finding that encouragement from managers is significant, and also the networking role of police managers is significantly positively related to knowledge sharing attitudes, for this reduces the gap between police investigators and other agencies.

Also based in Norway, Glomseth et al. (2007) describes that team culture has a significant influence on the extent of knowledge sharing, for team culture stimulates detectives to work together to solve crimes. Glomseth et al.'s (2007) research with senior investigation officers, however, found that officers normally are not encouraged or do not have good enough routines for knowledge sharing with close colleagues within the department or across departments, which affects the results of investigations, for important knowledge in police investigations is not always available when needed. The Canadian study by Abrahamson and Goodman-Delahunty (2013) further showed that cultures where police officers take a proactive approach

to obtaining and applying new information to respond to changes and to promote innovation show better information use outcomes.

Encouragement to share knowledge may also be impacted by a tendency within the police to see knowledge as associated with power. Papers from three countries (Bell et al., 2010, Norway; Ram, 2000, Netherlands; Seba & Rowley, 2010, UK) describe that individuals recognise that having knowledge equals having power, for by having knowledge, individuals have access to information which others do not. Knowledge in this sense can be seen as a strong differentiator in officers achieving their career aspirations. This may become a barrier for this denotes that the transfer of knowledge results in the loss of power for that individual and may make individuals reluctant to share their knowledge with others.

Several papers give recommendations for how forces can encourage officers to share knowledge. Luen and Al-Hawamdeh (2001), in research with the Singapore Police Force, argue that the key is to enhance the culture so that police officers are able to recognise the value of knowledge and knowledge sharing and be willing to share knowledge with the organization. It is argued that knowledge management must work in tandem with other measures such as education, training and staff motivation.

Loss of Knowledge

Hu (2010), in research with New Jersey State Police, US, describes the impact of police knowledge being lost as the 'baby boom generation' approach retirement age and police forces failing to capture and retain retirees' knowledge before they leave. A survey conducted with both retirees and incumbent officers examined differences in perceptions regarding the loss of knowledge and found that both groups believed that knowledge was being lost from the police force as officers retired. The types of knowledge being lost were described as mostly person or experience orientated – those aspects of knowledge which are not taught in traditional police officer training but which are learnt by officers through experience gained throughout their police career. In particular three categories of knowledge were described: skills in internal management; interaction with external actors; and specialised expertise and techniques. Hu (2010) describes a challenge for forces to capture and retain knowledge and recommends that before initiating any knowledge management strategy, identifying what knowledge is being lost and what knowledge is critical to the organization is the first step to ensure the success of such a program. The author's research with the New Jersey State Police finds that effective management and leadership is important to ensure that knowledge is retained and that there should be a higher emphasis on training and the use of information technology to pass on knowledge.

5. What are the key practical recommendations to promote knowledge sharing in policing contexts?

The main types of practical recommendations for improving the effectiveness of knowledge sharing that are made by researchers can be classified into six major themes:

1. *Proactive role of management in promoting knowledge sharing:* Authors highlighted the crucial part that police management could play through engaging in cross-organization networking behaviour (Berg et al., 2008) and leading by example (Goh et al., 2009).
2. *Providing training and education in knowledge sharing activities and processes:* Several authors felt that it was not a given that staff knew how to manage knowledge and hence some structured learning activities, particularly for managers, would be beneficial (e.g. Hu, 2010; Kelty, Julian & Ross, 2013; Goh et al., 2009). In the realm of technological methods, Hughes and Love (2004) make the point that managers will have to develop skills that not only enable them to clearly articulate organizational ICT requirements but also to ensure that implementation strategies to manage the various stages of system identification to user acceptability are informed by those requirements.
3. *Creating a knowledge sharing culture:* Given the complexity of police day-to-day activities, it is vital that an organizational culture is promoted which encourages and values the sharing of important knowledge (Goh et al., 2009). Technology is being increasingly used to communicate between officers but social interactions are also important. Hu's (2010) study found that retiring police officers were more likely to pass on their knowledge through personal interactions rather than depositing it in technological databases. Lindsay et al. (2009) therefore recommend that senior management implement long-term initiatives to develop a knowledge culture with regular team briefings and team building events commonplace. These authors also point out the trend that as police officers are using mobile technologies more to spend increasing amounts of time out of the station there is less face-to-face interaction; they suggest introducing or maintaining staff canteens as a means of stimulating informal interchanges.
4. *Identifying which knowledge is important to share and where it resides:* Not all knowledge can, or should, be shared within and outside the organization so systems need to be in place to identify which knowledge should be shared (Seba & Rowley, 2010). One example of good practice in this area is the UK's National Intelligence Model (NIM), which has a 5 x 5 x 5 scoring process for each piece of intelligence to assess its worth and scope for sharing. Hu (2010) also cites the importance of recognising which knowledge is being lost when people leave the organization.
5. *Systematic dissemination, implementation and evaluation of knowledge sharing practices:* It is advocated that evidence is regularly collected on the effectiveness

of knowledge sharing activities or practices and that those that are successful are implemented widely (Abrahamson & Goodman-Delahunty, 2013; Willocz, 2007). User involvement in design and implementation of systems is particularly recommended (Adang, 2009). Staffleu, Hengst and Hoorweg (2011) describe how the Front Office Back Office (FOBO) system of the HollandsMidden police force in the Netherlands is an example of good knowledge sharing practice.

6. *Having formal strategies for management of explicit and tacit knowledge:* A key recommendation is the need for police organizations to formally address intra- and inter-organizational knowledge challenges by having specific strategies for them (Abrahamson & Goodman-Delahunty, 2013). Seba and Rowley (2010) note the importance of ensuring the transfer of implicit knowledge (informal 'know-how', wisdom, intuition gathered by individuals through experience) to explicit forms (visible, written aspects such as manuals or databases). Furthermore, Dhoest and Gunst (2009) outline the importance of integrating information databases and procedures between judicial and administrative policing functions in Belgium, while Van den Broeck and Bourdoux (2009) stress the value of developing clear objectives and guidelines regarding information gathering, processing and analysis.
7. *Compatibility of systems (inter- and intra-organizational and cross agency):* Creating compatible technological systems, databases, and information sharing legislation across forces and external agencies, locally, nationally and internationally, is recommended in order to streamline processes and speed up the process of knowledge sharing (Boyle et al., 2013; Dhoest & Gunst, 2009; Sanders & Henderson, 2013; Stentzel, 2010).

6. What are the major research recommendations suggested by studies in the area?

The recommendations made in the literature for further research can be considered along eight major themes:

1. *Conduct empirical research to test theoretical assumptions / frameworks:* It was clear that much research had either developed theoretical frameworks without testing them or conducted empirical work on an atheoretical basis. However, Gottschalk and colleagues (e.g. Gottschalk, 2006a, 2006b; Gottschalk & Dean, 2010) have attempted to develop theoretical models in their work which could provide the basis for further empirical testing. Goh et al., (2009) make a specific recommendation for carrying out more research in closed information environments to get insights into knowledge management and information sharing. Abrahamson and Goodman-Delahunty (2013) demonstrate how information sharing models from non-policing domains can be adapted and add value to policing research investigations.
2. *Explore the impact of technology on knowledge sharing:* Although technology-based methods were the most common method of knowledge sharing studied, there was still much scope for focusing on the use of specific types of technology and

its implications (Hughes & Love, 2004). Wilz and Reichertz (2008) would like more focus on email communication and its role in the relationship between police and citizens; they also recommend that virtual communication and coordination between police organizations should be analysed with regards to centralisation or decentralisation, transfer of knowledge and tasks, trust, data protection and responsibilities.

3. *Explore the impact of leadership and management on knowledge sharing:* Studies had highlighted the potentially influential role of management but the most supportive activities and leadership styles of leaders still needed to be clarified for different modes of knowledge sharing. Berg et al. (2008) advocate an investigation of a coaching approach by managers compared to traditional transactional or transformational styles.
4. *Investigate the impact of knowledge being lost from policing organizations:* This was quite an interesting issue to consider in that it addressed storage of knowledge and not just sharing. Given the financial upheavals in many European countries and concomitant downsizing of police organizations, this would be a timely issue to investigate. Hu (2010) recommends further investigations into the types of knowledge being lost and the reasons for this.
5. *Research challenges for knowledge sharing arising from handling sensitive and personal information:* Different types of knowledge will have different implications for sharing and this needs to be further explored, particularly with regards to ensuring the security of information or legal sensitivities (Seba & Rowley, 2010). Boyle et al. (2013) demonstrated one example in their study of how limited patient information in Emergency Departments could be shared with local police to benefit regional crime strategies and more interventions need to be evaluated in this area.
6. *Explore best practice in knowledge sharing across countries:* Pockets of good practice were identified in the studies but a cross-national research perspective needs to be taken to comparatively evaluate practices and also to assess the transferability of such initiatives across situations or contexts (Staffleu et al., 2010).
7. *Investigate the management of different types of knowledge:* As above, implications for knowledge sharing can vary depending on the nature of the information being considered. For example, legislation can provide a strong guide as to what is permissible. Authors also proposed the translation of implicit, personalised knowledge of police officers into explicit, widely accessible forms should be researched more intensively (e.g. Seba & Rowley, 2010).
8. *Explore enablers and barriers relating to inter-agency working:* We highlighted in the introduction the different scope of inter-organizational knowledge sharing but the literature addressed very few of these mechanisms formally and hence a more formalised cross-boundary investigation is required (Kim et al., 2013; Sanders & Henderson, 2013).

4. Discussion

The aim of this paper was to systematically review the international literature on knowledge sharing within and between police organizations. This is the first such summary of the literature and it was also strengthened by the fact we had input from nine other countries outside the UK where English was not the first language. We were surprised in terms of how little good empirical research there had been in the area to date, with some COMPOSITE Consortium countries reporting no relevant papers on the topic within their region at all. Supporting the views of other policing academics (Manning, 2000; Marenin, 2005), this does suggest an urgent need to conduct new studies on the sharing of knowledge which compares practices and influences in police forces throughout Europe and other regions. However, a number of useful key themes did arise from our review.

As we suggested in the Introduction, by far the most common type of knowledge studied concerned the sharing of crime handling information or criminal intelligence, followed a long way behind by information on best practices, informal knowledge and experiences, legal information, administrative knowledge, employee information and technological knowledge. There is therefore a need to investigate the comparative challenges of sharing different types of knowledge, beyond just criminal intelligence. Furthermore, there was a limit to the organizational scope of the studies found with the majority focused on knowledge sharing across functions and hierarchical levels within the police organization. Less common was exploration of knowledge exchange between different forces or other agencies (e.g. criminal justice agencies, local government, Europol). Given that notable policing-related academics stress the importance of the rise of transnational policing and closer relationships between police and non-police organizations (e.g. Ericson & Haggerty, 2000; Marenin, 2005; Sheptycki, 2007), the review shows our understanding of inter-organizational information exchange is still limited and requires further exploration.

Technology-based practices were the most common methods of knowledge sharing or management studied. This is unsurprising given the dramatic rise in technology use generally in society and Chan (2001) usefully outlines how the drive for improved efficiency, performance and public accountability have driven this in the policing context. Particular aspects examined in our review included the setting up of computer databases to share information on regional and national bases and the challenges of maintaining up-to-date data and encouraging use of these repositories by officers. The increase in mobile technologies in the 21st Century (e.g. laptops, digital radios, and smartphones) has hugely increased the amount of information available to police officers while out on patrol. However, this can bring drawbacks including reducing the amount of time officers spend on operational duties due to increased reporting demands (Koper et al., 2014) and the sheer difficulty of sorting and interpreting large quantities of data (Sheptycki, 2007). While increasing the possibilities of 'just-in-time' police activities, researchers have also pointed out that the physical separation of staff may lead to a reduction in personal and social knowledge sharing (e.g. Lindsay et al., 2009).

There therefore seems to be a gap in the literature with regards to assessing the relative strengths and weaknesses of non-technological versus technological methods of sharing knowledge.

Four main themes arose regarding major influences on knowledge sharing. First, there is the importance of having formal and co-ordinated knowledge management strategies. The literature highlighted the issue that such strategies are commonly fragmented and do not sufficiently connect regional, national and international functions (Seba & Rowley, 2010). Second, a number of issues arose around the role of technology in knowledge sharing, such as technical proficiency of staff, the expense of maintaining and updating systems and disparate communication and computer systems existing between both different forces and different agencies. Third, organizational culture was seen as a key influence, in terms of different modes of encouragement for knowledge sharing (or the opposite as 'knowledge sharing hostility'), building up a team ethos and issues around knowledge as power. Over forty years ago, Bittner (1970) discussed how there was a reluctance to share information between police sub-cultures and ranks. Even though the introduction of new technologies has now improved the potential speed and quantity of communication, our review suggested there are still cultural pressures that may limit police personnel's motivation to use the technologies to share information. Fourth, there was some insight into the loss of knowledge from organizations when key personnel leave the police organization through retirement or for other reasons. The issue here is then how best to capture the knowledge of individuals so it is stored organizationally, rather than on an individual basis. These themes link to the wider literature on knowledge management and organizational learning which address the processes by which organizations acquire, create, store and utilise, as well as share, information (Argote, 2011; Easterby-Smith & Lyles, 2011; King, Chung & Haney, 2008). Policing research would benefit from testing and adapting theoretical frameworks from that general literature. For example, Easterby-Smith, Lyles and Tsang (2008) provide an interesting model which outlines how various donor and recipient organization features (absorptive capacity, transfer capability, motivation to teach/learn), knowledge characteristics (tacitness, ambiguity and complexity) and inter-organizational dynamics (power relations, trust and risk, structures and mechanisms and social ties) influence the transfer of knowledge between institutions. Applying this framework to analysing knowledge exchange relationships between policing and non-policing organizations or in transnational contexts would provide a valuable (and much-needed) theory-driven basis for subsequent empirical research.

A particularly important contribution of this systematic review was to aggregate the major sets of practical recommendations for improving knowledge sharing provided by researchers into six themes. Three of these related to police organizations having procedural clarity in terms of: having formal strategies for management of explicit and tacit (experiential, individualised, specialist) knowledge; having procedures to identify which knowledge is important to share and where it resides; and systematically disseminating, implementing and evaluating knowledge sharing practices so good initiatives are widely taken up. The other recommendations could

be seen as encouraging the people within the organization to generate a sustainable knowledge sharing culture. To aid this, it was clear that police management needed to be proactive in promoting this vision through networking and leading by example and that training and education should be provided to users and managers to develop the knowledge, skills and motivation of employees to share information more effectively. It is hoped that these research-based points of action can provide useful guidance for those leading policing organizations.

Finally, echoing Manning (2005), in terms of future research directions, authors in our review expressed there was a clear need to conduct empirical research to test theoretical assumptions and frameworks (Goh et al., 2009). Although Gottschalk (2006a, 2006b) provides good attempts to develop knowledge sharing theories in the policing context, these only focus on knowledge sharing in criminal investigations and the role of knowledge management systems in supporting that. There would be value in applying and testing in the policing context more general theoretical frameworks such as that by Wang and Noe (2010) which outline how individual, interpersonal, team, organizational and cultural characteristics can impact on individuals' motivation and consequent knowledge sharing behaviour. Easterby-Smith et al.'s (2008) inter-organizational knowledge transfer model has already been discussed above but Dolowitz and Marsh's (2000) theoretical framework on policy transfer could also be useful for investigating policing policy changes across contexts. The studies we reviewed also highlighted a number of specific aspects to focus on including further exploration of the impact of technology on knowledge sharing and the key role of leadership and management. There was also a theme of tackling the management of different types of knowledge and dealing with the research challenges for knowledge sharing arising from handling sensitive and personal information. As Brodeur and Dupont (2006) point out, secrecy has not yet received the attention it deserves. The inter-organizational dimension came into play with a desire to explore enablers and barriers relating to inter-agency working and, internationally, best practice in knowledge sharing across countries. An interesting, contemporary theme was also how police organizations could deal with the loss of knowledge when personnel leave the organization. Several clear avenues of research for policing researchers have been therefore suggested.

We believe we have made an important contribution to the understanding of knowledge sharing in police organizations but we do acknowledge there were certain limitations to the review. We decided to only look at papers published after 2000 to provide a contemporary overview and there may be more longstanding articles that could add to a greater historical portrait of the literature. A strength of our review was the attempt to go beyond just English-language publications but we were surprised at the lack of literature on the topic in some of the European COMPOSITE Consortium countries. Researchers in the future could attempt to further update the review with studies published in non-European languages. In following the systematic literature review protocol, the search for articles on established research databases was based around the keyword search terms described in the Methodology but it may be that some potentially relevant articles did not

use those keywords and hence were omitted. Although our focus was on selecting peer-reviewed papers, official policing papers and conference papers to ensure credible research resources were covered, it could have been the case that other sources of research literature were overlooked. The databases in different countries also varied in their coverage. A final point to note is that the literature reviewed was dominated by questionnaire, interview and case studies. We do echo the thoughts of Manning (2005) that more studies investigating the reality of knowledge-sharing in action using methods such as ethnography would help clarify the nuances of the phenomenon. Despite these constraints, we feel that the review has offered a new and valuable contribution on this important issue.

In conclusion, this first systematic literature review highlighted a number of key findings regarding knowledge sharing in police contexts and suggested a number of research-based practical recommendations for police organizations. There were also distinct research gaps identified since past studies tended to revolve around intra-organizational knowledge sharing, the use of technological methods and a focus on crime handling information or criminal intelligence only. Future research activities therefore need to compare how knowledge is shared using different methods across intra- and inter-organizational boundaries and to identify both generalizable and contextually-specific barriers, facilitators and outcomes for this crucial aspect of police functioning.

Acknowledgements

This research was funded by the European Commission as part of the COMPOSITE project (FP7 contract no. 241918).

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